

Roundabout: A Safety Improvement Countermeasure

By

Fredrickson, Hoskins and Singh

City of Lincoln, Nebraska

05/23/05

City of Lincoln's Safety Improvement Process

- Crash Record System
- Identify High Crash Intersections
- Safety Engineering Analysis
- Sequencing of Potential Projects
- Programming and Funding of Projects
- Public & Private Participation
- Implementation of Projects
- Evaluation & Results of Implemented Projects

33rd St. and Sheridan Blvd.

A Modern Roundabout

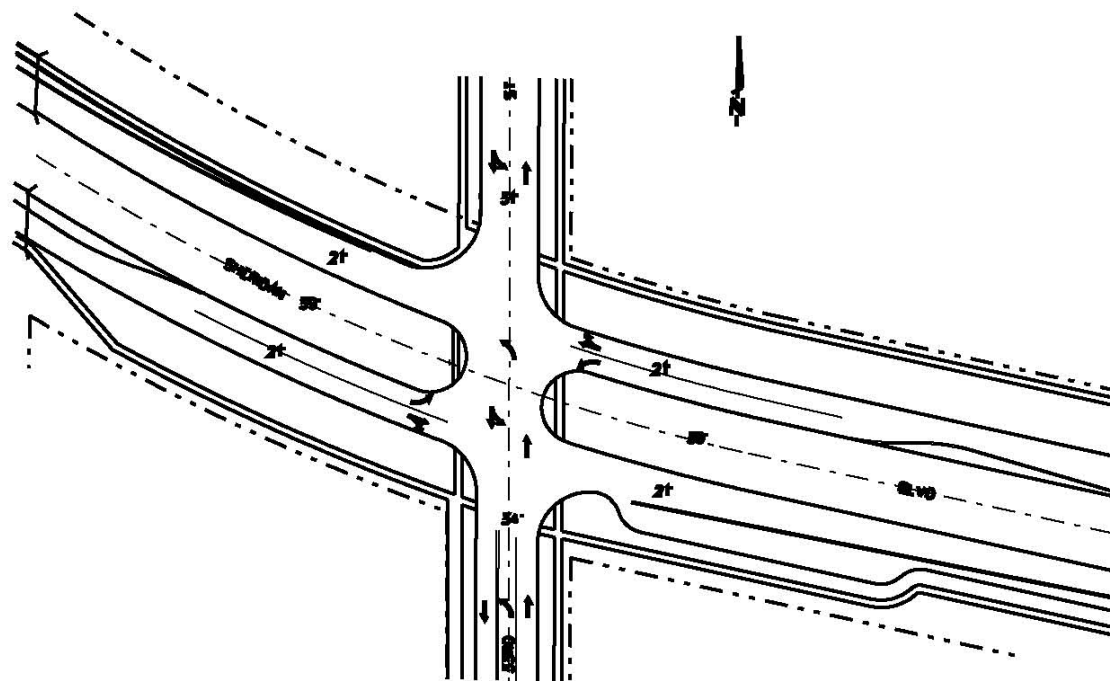
- The presentation addresses the safety improvement process used by the City of Lincoln, Nebraska in the successful implementation of the Roundabout.
- What makes this intersection unique? A four way intersection with Traffic Signal control has been replaced by a modern Roundabout.
- The first modern Roundabout at an intersection of two major arterial streets in Nebraska.

EXISTING - LOOKING WEST



S. 33rd & Sheridan-Existing





EXISTING
33RD & SHERIDAN

33rd St. and Sheridan Blvd.

General Attributes

- An Intersection of two Major Arterials
- Traffic Signal Controlled since 06/26/1980
- High Crash Location, ranked #3 in 1996, #2 in 1997 and #1 in 1998.
- 1999 ADT of 16,700 vehs
- 2025 Projected ADT of 24,500 vehs
- Proximity to a Park, a Historical Neighborhood, an Elementary School, a Church and a Gas & Shop
- 35mph posted Speed Limits on both Arterials

33rd St. and Sheridan Blvd.

05/98 & 06/04 Vehicle Volumes

Pm Peak	NB	SB	EB	WB
Left	118 / 145	7* / 10*	84 / 94	39 / 28
Thru	196 / 201	295 / 239	410 / 302	198 / 155
Right	19 / 34	85 / 78	217 / 190	13 / 16
Total	333 / 380	387 / 327	711 / 586	250 / 199
Trucks	1	5	8	4

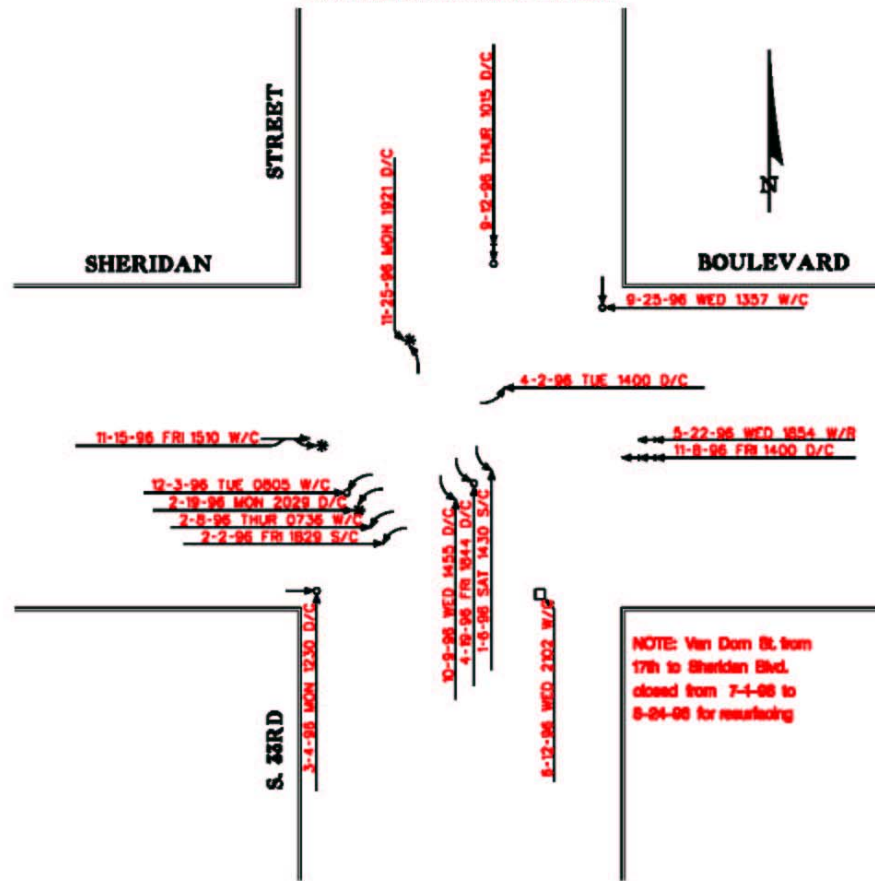
* Left turns prohibited for SB to EB movements

33rd St. and Sheridan Blvd.

01/01/96 to 12/31/98 Crashes by Severity

Before Period	1996	1997	1998	Total	
Injury Crashes	5	6	8	19	35 %
Property Damage	8	7	16	31	57 %
Non Reportable	3	1	0	4	08 %
Total Crashes	16	14	24	54	100 %
Est. Cost of Crashes	\$260 k	\$290 k	\$430 k	\$980 k	

**COLLISION DIAGRAM
CITY OF LINCOLN
TRANSPORTATION DEPARTMENT
TRAFFIC ENGINEERING DIVISION**



LOCATION: 33RD & SHERIDAN BLVD.

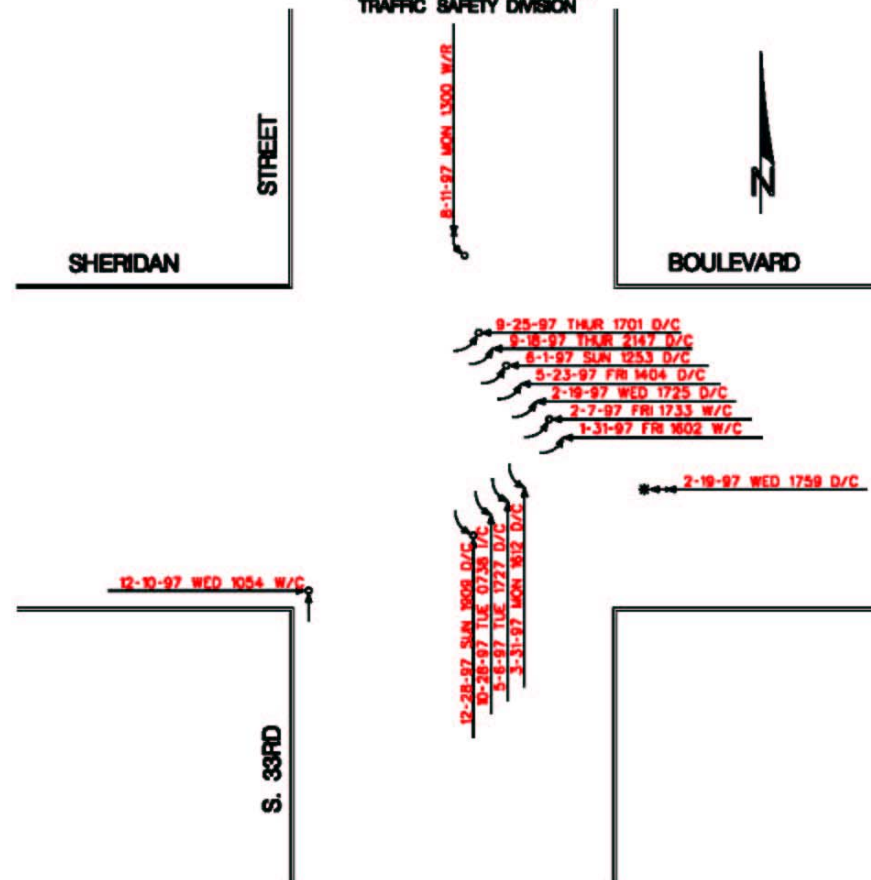
DATE COVERED: 1-1-96 to 12-31-96

TIME	RTANG	TURN	REND	PED	BIKE	SDSWP	FOBJ	OTHER	TOTAL
0630 - 0900	AM PEAK	2							2
0900 - 1200	AM NORM		1						1
1200 - 1530	PM NORM	2	3	1		1			7
1530 - 1800	PM PEAK								0
1800 - 0630	NIGHT		4	1			1		6
TOTAL ACCIDENTS		2	9	3	0	0	1	1	16

Δ Includes Weekend 0630 - 1100

ΔΔ Includes Weekend 1100 - 1800

COLLISION DIAGRAM
CITY OF LINCOLN
PUBLIC WORKS DEPARTMENT
TRAFFIC SAFETY DIVISION



LOCATION: 33RD & SHERIDAN BLVD.

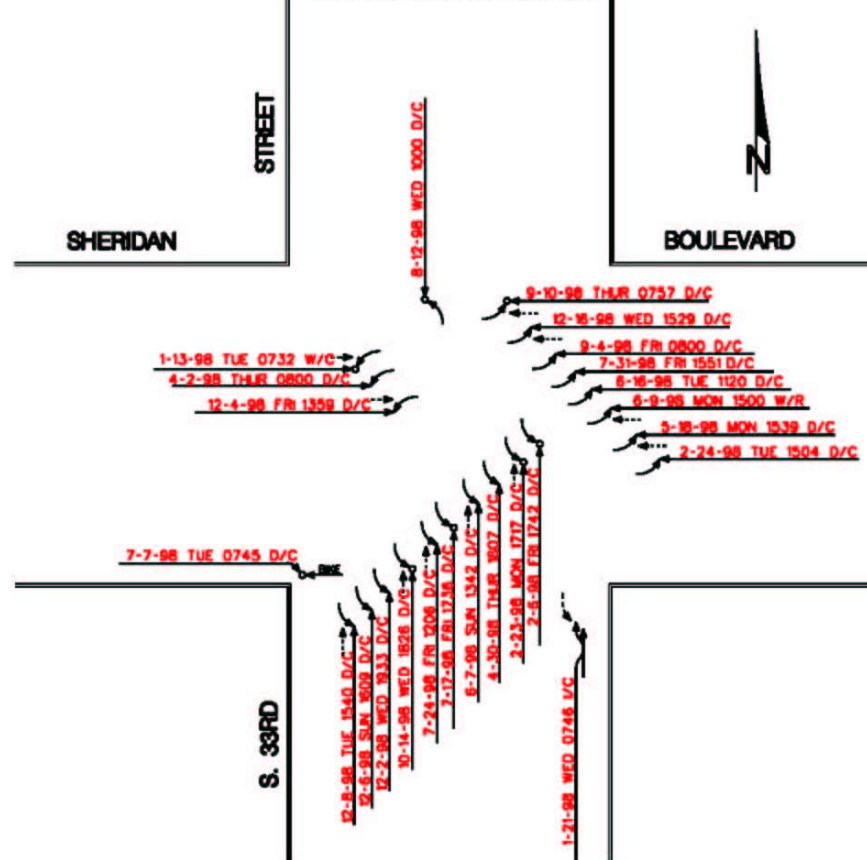
DATE COVERED: 1-1-97 to 12-31-97

TIME	RTANG	TURN	REND	PED	BIKE	SDSWP	FOBJ	OTHER	TOTAL
0630 - 0900	AM PEAK		1						1
0900 - 1200	AM NORM Δ	1							1
1200 - 1530	PM NORM ΔΔ		2	1					3
1530 - 1800	PM PEAK		6	1					7
1800 - 0630	NIGHT		2						2
TOTAL ACCIDENTS		1	11	2	0	0	0	0	14

Δ Includes Weekend 0630 - 1100

ΔΔ Includes Weekend 1100 - 1800

**COLLISION DIAGRAM
CITY OF LINCOLN
PUBLIC WORKS DEPARTMENT
TRAFFIC SAFETY DIVISION**



LOCATION: 33RD & SHERIDAN BLVD.

DATE COVERED: 1-1-98 to 12-31-98

TIME		RTANG	TURN	REND	PED	BIKE	SDSWP	FOBJ	OTHER	TOTAL
0630 - 0900	AM PEAK		4			1	1			6
0900 - 1200	AM NORM	Δ	2							2
1200 - 1630	PM NORM	ΔΔ	7							7
1630 - 1800	PM PEAK		6							6
1800 - 0630	NIGHT		3							3
TOTAL ACCIDENTS		0	22	0	0	1	1	0	0	24

Δ Includes Weekend 0630 - 1100

ΔΔ Includes Weekend 1100 - 1800

3- Year Crashes by Type

33rd St. and Sheridan Blvd.

Before	1996	1997	1998	Total	
Rt. Ag.	2	1	0	3	6 %
Turn	9	11	22	42	78 %
R. End	3	2	0	5	10 %
Other	2	0	1	3	6 %
Total	16	14	23	54	100 %

S. 33rd & Sheridan-Existing



CONCEPT (looking North)
Split Phase Sheridan



CONCEPT - TRADITIONAL LOOKING WEST



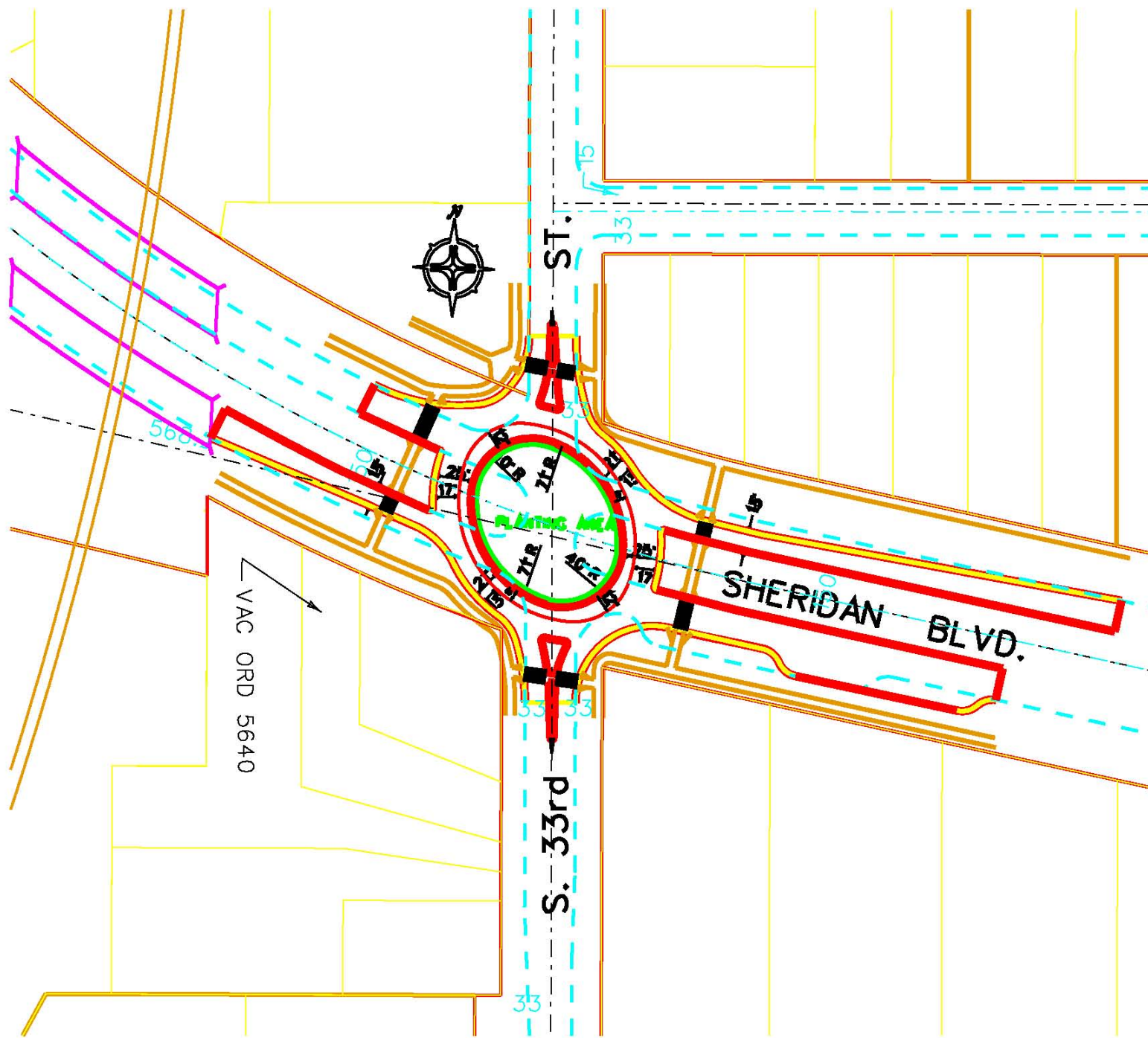
CONCEPT - ROUNDABOUT



33rd St. and Sheridan Blvd.

Comparison of Countermeasures

	Existing	Split Phase	Channelize	Rndabout
Inter.- LOS	'C' (20' - 35')	'F' (80' +)	'D' (35' - 55')	'B' (10' - 20')
Int. Avg Delay	28' per veh.	105' per veh.	41' per veh.	15' per veh.
Worst Direct.	WB	EB	EB	N, E & WB
Avg. Delay & LOS Worst Direct.	112' – 'F'	168' – 'F'	67' – 'E'	17' – 'B'
Est. Capital Cost	N/A	\$290 k	\$480 k	\$250 k
Veh / Veh Conflicts	32	32	32	8
Veh / Ped Conflicts	16	16	16	8

















16 12:38 PM







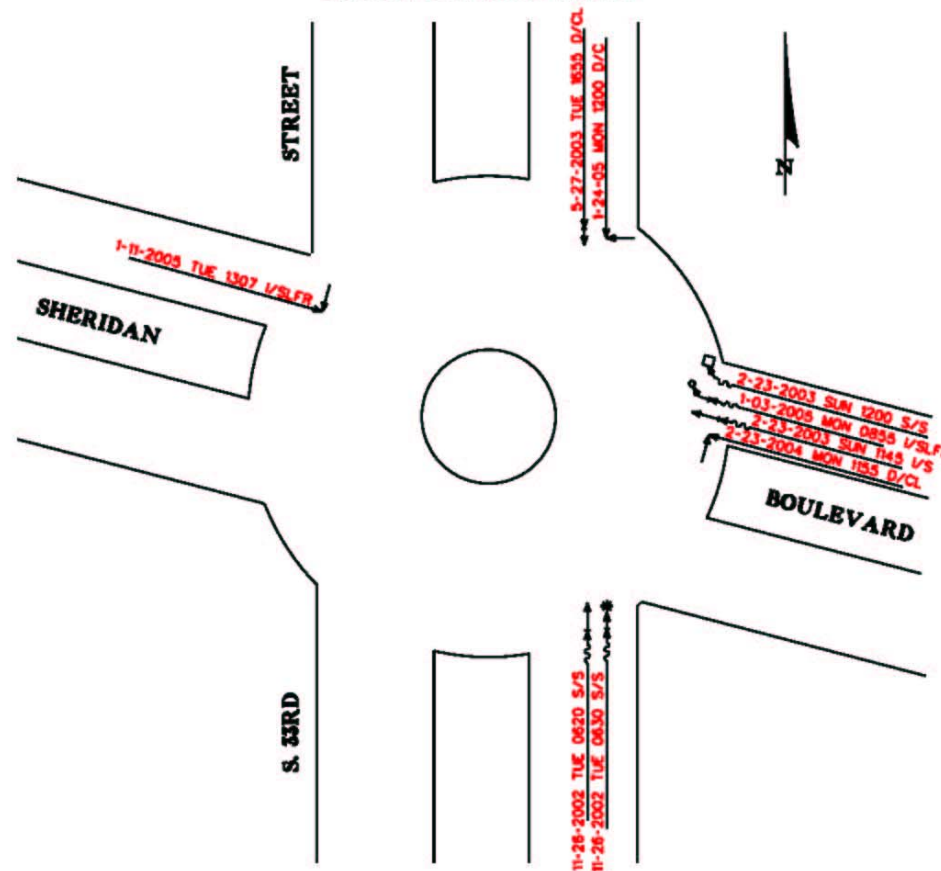
33rd St. and Sheridan Blvd.

Before & After Comparison by Severity

	01/1/96 to 12/31/98 (36m)	7/1/02 to 05/15/05 (35m)	Change in Number	Change in Percentage
Injury Crashes	19	01	- 18	- 95%
Property Damage	31	07	- 24	- 77%
Non Reportable	04	01	- 03	- 75%
Total Crashes	54	09 *	- 45	- 83%
Est. Cost of Crashes	\$980k	\$110k	- \$810k	- 89%

* Denotes that 6 crashes occurred during snow/icy road conditions

**COLLISION DIAGRAM
CITY OF LINCOLN
PUBLIC WORKS DEPARTMENT
TRAFFIC ENGINEERING DIVISION**



LOCATION: 33RD & SHERIDAN BLVD. RNDABOUT

DATE COVERED: 7-1-2002 TO 4-15-2006

TIME		RTANG	TURN	REND	PED	BIKE	SDSWP	FOBJ	OTHER	TOTAL
0630 - 0900	AM PEAK			2						2
0900 - 1200	AM NORMΔ	1								1
1200 - 1530	PM NORMΔΔ	2		1				1		4
1530 - 1800	PM PEAK			1						1
1800 - 0630	NIGHT			1						1
TOTAL ACCIDENTS		3	0	5	0	0	0	1	0	9

Δ Includes Weekend 0630 - 1100

ΔΔ Includes Weekend 1100 - 1800

33rd St. and Sheridan Blvd.

Before & After Comparison by Type

	Before	After	Change in Number	Change in Percentage
Right Angle	3	3	0	nc
Turning	42	0	-42	- 100%
Rear End	5	5	0	nc
Other	3	1	-2	- 67%
Total	54	9	-45	- 83%

33rd St. and Sheridan Blvd.

Comparison of Expected vs Actual Results

PM Peak	Existing Before	Rndabout Expected	Rndabout Actual 6/4
Inter.- LOS	'C' (20' - 35')	'B' (10' - 20')	'A' (<10')
Int. Avg Delay	28' per veh.	15' per veh.	5' per veh.
Worst Direct. Delay & LOS	WB 112' – 'F'	N, E & WB 17' – 'B'	NB 8' – 'A'
Est. Constr. Cost	N/A	\$250 k	\$300 k
Veh / Veh Conflicts	32	8	8
Veh / Ped Conflicts	16	8	8



Acknowledgements:

FHWA, NDOR, HWS, OA, Citizen Design Comm., Pavers Inc., PW-ES, Parks & Rec.

Comments & Questions

Thank you.

For Details Contact:

Virendra Singh

Manager, Long Term Planning / MPO

531 Westgate Blvd, Suite – 100

Lincoln, Nebraska 68528

Phone: (402) 441-7835

E-mail: vsingh@lincoln.ne.gov

City of Lincoln Web site:

www.lincoln.ne.gov